Psychotria carrascoana (Rubiaceae), a New Species from the *Carrasco* Vegetation of Northeastern Brazil

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ABSTRACT. *Psychotria carrascoana* (Rubiaceae, Psychotrieae) is here described and illustrated. It is endemic to *carrasco* vegetation, a closed, shrubby, xerophilous vegetation on quartzitic sand soils, on the plateaus of the Serra da Ibiapaba and Serra do Araripe, at altitudes of 800 to 900 m, state of Ceará, Brazil. Because of its reduced, triangular stipules, leaves drying pale green, commonly solitary flowers, and dorsally tricostate pyrenes, this species is placed in *Psychotria* subg. *Heteropsychotria*.

Key words: *carrasco*, Ceará, northeastern Brazil, *Psychotria*, Psychotrieae, Rubiaceae, shrubland.

As part of the project *Rubiaceae do Estado do Ceará*, in northeastern Brazil, fieldwork was conducted during 1998–2000, which has produced about 400 collections of species of this family. A preliminary checklist of the Rubiaceae of Ceará was recently presented (Delprete et al., 2001), and an annotated checklist will be published in the near future (Delprete & Souza, in prep.). Two new species of Rubiaceae were recently described from the arid vegetation of this state (*Simira gardneriana* Barbosa & Peixoto (2000); *Mitracarpus longicalyx* Souza & Sales (2001)), and the identity of some other taxa collected during this project is currently under study. Among these, a species of *Psychotria* restricted to *carrasco* vegetation, and readily distinguishable by its small leaves drying pale green, triangular stipules, flowers commonly solitary, and dorsally tricostate pyrenes, is described below.

Ecological Observations About *Carrasco* Vegetation

The definition of *carrasco* vegetation has long been debated, as it is not readily distinguishable from that of *caatinga*, the widespread xerophilous vegetation of northeastern Brazil. *Caatinga* is commonly characterized by two vegetational layers: sparse to moderately dense trees and shrubs frequently armed with thorns and almost completely leafless during the dry season, and the lower layer with the presence of Bromeliaceae and Cactaceae, and annual herbs (Rizzini, 1997). Andrade-Lima (1978) stated that *carrasco* vegetation is physiognomically distinct from *caatinga* vegetation because of the high density of shrubs and treelets, single-layered vegetation, and the almost complete absence of Cactaceae and Bromeliaceae. Rizzini (1997) and Fernandes (1981) recognized *carrasco* vegetation as sufficiently distinct from *caatinga* vegetation. Fernandes (1990) and Fernandes and Bezerra (1990) postulated two possible hypotheses about the identity and origin of *carrasco* vegetation: either as a distinct natural vegetation, or as a result of partial degradation of the *cerradão* vegetation, which gives the general aspect of a dense *capoeira* (secondary vegetation that can be originated from the degradation of several possible vegetation types). *Cerradão* is usually characterized by three vegetational layers: a tree layer 8–12(–18) m tall, with closed canopy and almost completely devoid of epiphytes; an intermediate arbustive layer about 3–5 m tall and with sparse shrubs and rare lianas; and a lower herbaceous layer, composed primarily of Cyperaceae, Poaceae, and Bromeliaceae (cf. Rizzini, 1997).

Araújo et al. (1998a, 1998b), in a project focused on the plant community and floristic composition of *carrasco*, studied three plots in the southern portion of the Planalto da Ibiapaba, near Novo Oriente, Ceará, Brazil. As a result of that study, only 31 out of 102 shrubby and arboreal species were found to

be exclusive to *carrasco*, while the other species were shared with the contiguous vegetation types. Those data alone confirmed the difficulty of deciding if *carrasco* vegetation should be treated as a degraded *cerradão* or a distinct vegetation type. After a series of additional studies, Araújo and Martins (1999) and Araújo et al. (1999) recently concluded that *carrasco* vegetation can be defined as a deciduous, dense, single-layered shrubland, with vines, irregular canopy, and sparse trees, with an average annual precipitation of 668–1289 mm, a dry season ranging from 5 to 7 months a year, growing on deep, acidic, distrofic quartzitic sands, at 700–900 m elevation. According to those authors, *carrasco* vegetation occurs within the semi-arid domain of northeastern Brazil, at the Chapada do Araripe, southern Ceará, and Planalto da Ibiapaba, at the border area of the states of Ceará and Piauí. The new species of *Psychotria* described below is endemic to this vegetation (hence the specific epithet), and it grows in the shade of shrubs and treelets.

Psychotria carrascoana Delprete & E. B. Souza, sp. nov. TYPE: Brazil. Ceará: Planalto da Ibiapaba, Mun. Ubajara, Jaburuna Sul, 830 m, 5 Jan. 1995 (fl), *F. S. Araújo 1054* (holotype, EAC; isotype, NY). Figure 1.

Haec species, suffrutex usque ad 1.3 m altus, quoad inflorescentiam terminalem subsessilem paucifloram *P. subtriflorae* similis, sed ab ea stipulis triangularibus (nec bilobis), inflorescentia ebracteata (nec bracteis naviculiformibus subtenta), tubo corollae 1.7–2.8 mm (nec 6–7 mm) longo atque fructibus rubris (nec cyano-purpureis) diversa.

Subshrub 0.4–1.3 m tall, densely branched from the base; main stems often tortuous; bark thin, creamy white; *raphides* present in all plant parts. *Stipules* free at base, triangular, 1–2 × 0.8–2 mm, margin entire or sometimes denticulate, apex acute, glabrous outside, pubescent inside; *leaves* opposite, sessile to subpetiolate; petioles to 1.5 mm long; blades 9–30 × 2–9 mm, linear, narrowly elliptic to lanceolate, base attenuate, apex acute to obtuse, margins narrowly revolute, chartaceous, glabrous throughout, pale green; midvein prominent below, discolorous; secondary veins 5 to 9 each side, embedded within the lamina; domatia absent. *Inflorescence* uniflorous (rarely biflorous), terminal, on lateral short-shoots of 5 to 7 reduced nodes. *Flowers* subsessile to short-pedicellate; pedicels to 1.3 mm long; *hypanthium* broadly turbinate, ca. 2 × 1.2 mm, glabrous; *calyx* shallowly cupular; tube 0.2–0.3 mm long; calyx lobes 5(6), 0.3–0.5 mm long, deltoid to narrowly triangular, acute; *corolla* narrowly infundibuliform, 4.5–6.5 mm long, glabrous outside, with a ring of hairs from stamen insertion to mouth inside; corolla tube 1.7–2.8 mm long; corolla lobes 5 (rarely 6), 2.5–3.8 × 1.4–1.7 mm, oblong-ovate, acute and slightly thickened at apex, antrorse pubescent at basal portion inside; *stamens* subsessile, partially exserted; filaments 0.2–0.5 mm long, glabrous; anthers oblong, 0.7–0.9 × 0.3–0.5 mm; *disk* entire; *style* terete, 4–6 mm long; style branches spatulate, 0.5–0.7 × 0.3–0.4 mm. *Fruits* drupaceous, ovoid to ellipsoid, 3–5 × 3–4 mm, red; *pyrenes* plano-convex, dorsally 3-costate; *seeds* suborbicular, ca. 2.5 × 2 mm, pale brown; exotesta smooth.

Distribution, habitat, and phenology. Endemic to the *carrasco* vegetation of the Planalto da Ibiapaba and Chapada do Araripe, state of Ceará, and probably occurring in the same vegetation type in the contiguous state of Piauí, always observed and collected in the shade of taller shrubs, at 800–900 m elevation. Flowering specimens were collected in January, and fruiting specimens in March and September.

Paratypes. BRAZIL. **Ceará:** Planalto da Ibiapaba, Mun. Ubajara, Jaburuna Sul, 830 m, 27 Apr. 1994 (st), *F. S. Araújo 679* (EAC), 23 May 1994 (st), *768* (EAC); Planalto da Ibiapaba, Mun. Novo Oriente, Baixa Fria, 16 Feb. 1991 (st), *F. S. Araújo 278* (EAC); Planalto da Ibiapaba, Mun. Tianguá, 19 Nov. 1994 (st), *A. G. Fernandes & F. J. A. Matos EAC 21465* (EAC); Planalto da Ibiapaba, BR-222, 3 km from Tianguá, 3°45′S, 41°01′W, ca. 800 m, 21 Mar. 2000 (st), *Delprete et al. 7196* (EAC, NY, *uva* [Universidade Vale do Acaraú]), *7197* (EAC, *uva*), *7198* (EAC, NY, *uva*), *7199* (EAC, NY, uva), *7203* (EAC, uva); Chapada do Araripe, Mun. Crato, Sítio Mirindiva, 7°17′S, 39°33′W, 900 m, 29 Mar. 2000 (young fr), *Delprete et al. 7304* (EAC, NY, *uva*), *s.n.* (EAC, K, MO, NY, US); Chapada do Araripe, Mun. Crato, 19 Sep. 2001 (fr), *F. S. Cavalcanti & E. Silveira 843* (EAC, NY, *uva*).

Psychotria L., as traditionally recognized, is one of the largest genera of flowering plants, with about 2000 species worldwide. Several authors have tried to organize this taxonomic conundrum, either by dividing it into several smaller genera (e.g., Bremekamp, 1934), or by treating it as a large genus with many sections (e.g., Steyermark, 1972, 1974). *Psychotria* s.l. has been shown to be paraphyletic in the molecular phylogenies presented by Andersson and Rova (*rps*16; 1999), and Nepokroeff et al. (ITS and *rbc*L; 1999). Following the molecular data published by these authors and additional morphological evidence, the genera *Notopleura* Bremekamp and *Carapichea* Aublet have been recently resurrected by Taylor (2001) and Andersson (2002), respectively. *Notopleura* is easily distinguished, among other morphological characters, by its pseu-

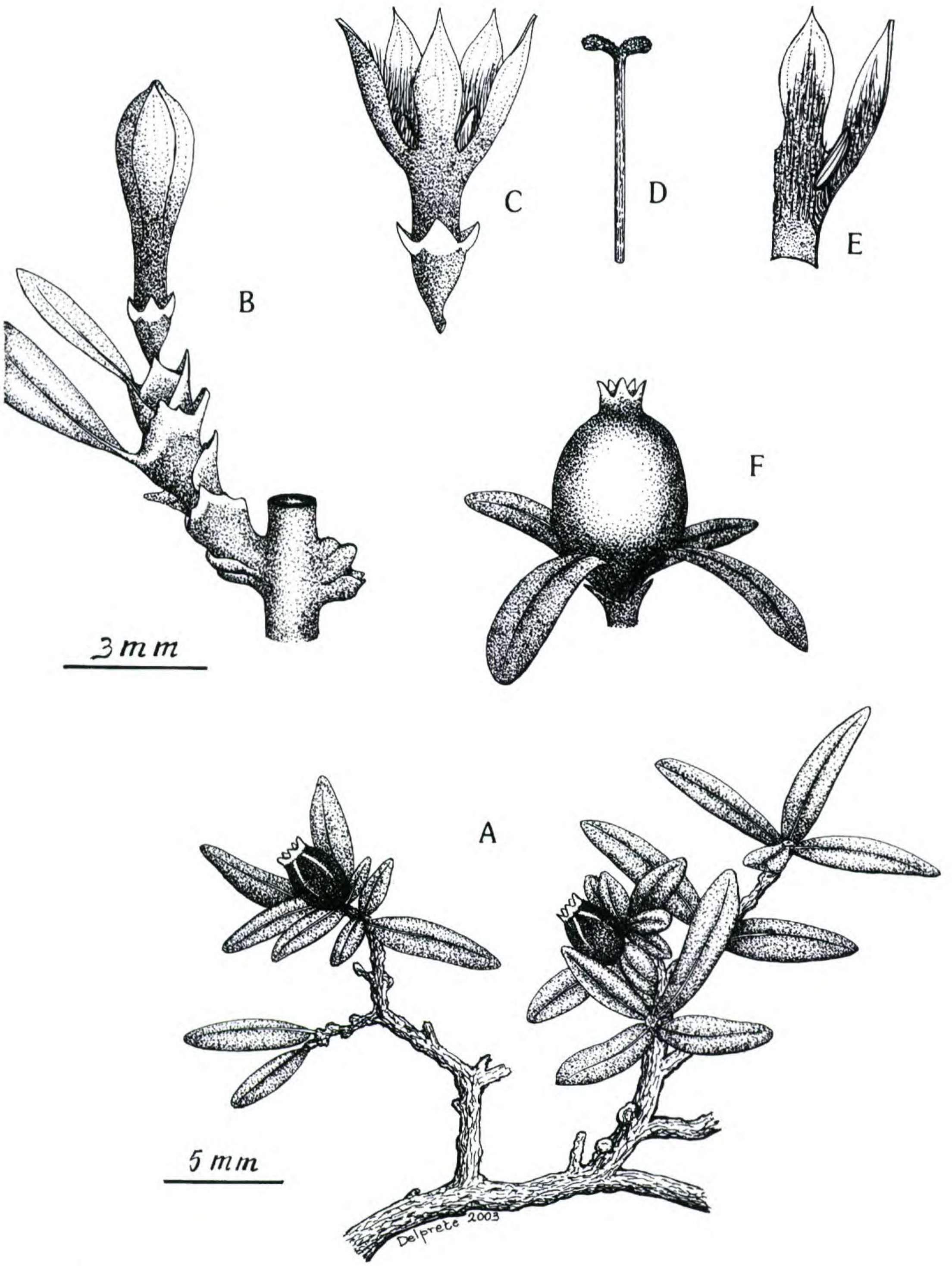

Figure 1. *Psychotria carrascoana* Delprete & E. B. Souza. —A. Branch with immature fruits. —B. Short-shoot with solitary, terminal flower bud. —C. Flower in anthesis. —D. Style. —E. Section of open corolla. —F. Mature fruit. A and F from photos of living material; B–E, from *Araújo 1054* (types, EAC, NY).

doaxillary inflorescences, and the sheathing stipules with an interpetiolar appendage inserted below the upper margin (Taylor, 2001); and *Carapichea* by its terminal, condensed inflorescences subtended by foliose bracts, pyrenes with germination slits on abaxial ridges, and persistent stipules, withering on the stem (Andersson, 2002; Delprete, 2001, 2003). The rest of the *Psychotria* complex, currently divided into subgenus *Psychotria* (Steyermark, 1972: 444) and subgenus *Heteropsychotria* Steyermark (1972: 484), remains taxonomically unresolved, and its close relationship with *Palicourea* Aublet has been addressed (e.g., Müller Argoviensis, 1881; Nepokroeff et al., 1999), but not yet resolved (Taylor, 1996, 1997, and work in progress).

About 11 species of *Psychotria* are known from the state of Ceará (Delprete et al., 2001), and among them *Psychotria carrascoana* is the species with the smallest leaves, and the only one with solitary (or rarely paired) flowers. This species has often been collected when sterile, mostly because of its minute, usually solitary, greenish white flowers, and therefore difficult to spot during anthesis. Because of the reduced, triangular stipules, leaves drying pale green, terminal flowers commonly solitary (or rarely in pairs), fruits red, and pyrenes dorsally tricostate, *Psychotria carrascoana* is placed in *Psychotria* subg. *Heteropsychotria*. This species is most similar to *Psychotria subtriflora* Müller Argoviensis (Zappi & Stannard, 1995: 571) because of the pauciflorous, subsessile, terminal inflorescences, but it differs by having stipules triangular (vs. bilobed, lobes narrowly triangular in *P. subtriflora*), inflorescences not subtended by bracts (vs. subtended by navicular bracts in *P. subtriflora*), corolla tube 1.7–2.8 mm long (vs. 6–7 mm long in *P. subtriflora*), and red fruits (vs. purplish blue in *P. subtriflora*).

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